## REMARKS

The Official Action mailed August 6, 2009 has been carefully considered. Claims 6-7 and 11-16 are pending in the present application and stand rejected. Claim 6 has been amended and claims 11, 15 and 16 have been cancelled. Reconsideration and allowance of the subject application, as amended, are respectfully requested.

### Claim Rejections

Claims 6-7 and 11-16 stand rejected under 35 USC §103(a) as being unpatentable over *Dorfman*, U.S. Patent No. 4,822,415 and further in view of *Branagan* et al., U.S. Patent No. 6,125,912.

As an initial matter, independent claim 6 has been amended to recite the following additional features: (1) forming a metallic coating at a thickness of 40 mil to 110 mil by high velocity oxy-fuel spray by melting said iron based metallic coating alloy to a liquid state; (2) wherein said deoxidizing elements remove oxygen from the metal surface layer and said deoxidizing elements are present in said alloy melt such that said deoxidizing elements remain dissolved in said alloy melt to retain an affinity for oxygen; and (3) wherein failure of said coating does not occur at a coating/metal surface interface. Support can be found at paragraphs [0014], [0020] and [0021] of the published application. No new matter has been entered.

As can be seen, Applicant has amended to positively recite that the method of HVOF is one that applies to forming a metallic coating of 40 mils to 110 mils. In addition Applicant has made clear that the deoxidizing elements remove oxygen from the surface layer and that the deoxidizing elements are present such that the elements remain dissolved in the alloy melt to retain their affinity for oxygen.

Applicant appreciates the remarks at page 3 of the *Office Action* where it was written that the outstanding rejection was based upon *Dorfman* in view of *Branagan*. Considering those remarks, and the prior statements in the *Office Action* of December 22, 2008, Applicant has therefore amended the claims as noted above, and would like to elaborate as follows.

One central argument was that the total amount of deoxidizing elements in the alloy as taught by *Dorfman* and *Branagan* had overlapped the pending claims. What is no longer

available through a combination of the two references, however, is that the deoxidizing elements are also selected such that deoxidizing elements remain dissolved in said alloy melt to retain an affinity for oxygen. It is also respectfully submitted that given *Dorfman* and *Branagan*'s teaching, such a requirement for the deoxidizing elements within the alloy melt can not be said to be necessarily present in the art, as the art fails to identify the solubility of the elements in any medium as an important characteristic, or a characteristic of any kind.

Furthermore, while the *Office Action* of December 2008 did point out that *Dorfman* produced a coating thickness at 1.3 mm, again, this was for a thermal spray alloy containing chromium, nickel, molybdenum, copper, boron and carbon, the remainder iron.

Even if one combines this with *Branagan*, such a composition only includes chromium in common, and does not include the requirement of manganese as recited in the pending claims. Furthermore, Applicant understands that *Dorfman* teaches that manganese is optional, as noted in the Office Action of August 6, 2009, the incorporation of such element was for the purpose of improving corrosion resistance and ductility, and in that sense, *Dorfman* and *Branagan* are not believed to teach or suggest its use as a deoxidixing element and the newly added feature that such elements remain dissolved in their host alloy such that they retain their affinity for oxygen.

This brings Applicant to the other newly added feature of the amended claims, which is that failure of said coating does not occur at a coating/metal surface interface. On this note, Applicant directs attention to paragraph [0021] of the published application:

> [**0021**] The collected values of bond strength are remarkable for several reasons. First, ASTM C633 standard requires that the coating be a minimum of 0.015 inches in thickness and most tests are carried out on coatings sprayed to thicknesses that are very close to this minimum because as the coating becomes thicker the chance of developing a critical flaw in the coating leading to premature failure is much greater. Second, the results of the tests were remarkable because, when failure of the coating was observed, the coating generally failed due to a critical flaw arising from the spray process. Thus, the failure of the coatings, when failure was found, did not generally occur at the coating/metal substrate interface, indicating an extremely effective metallurgical metal to metal bond which is formed as a result of the cleansing of the native oxide layer of the substrate. Such effect had not previously been observed with thermal spray coatings. Finally, the magnitude of the bond strength of the high velocity oxy-fuel coatings (12,000 to >14,000 psi) is exceptional for metallic coatings, and is even superior to the bond strength of materials that are specifically used as intermediate bond coats, such as 75B Nickel Aluminides that generally provide bond strengths in the range of about 7,000 psi.

Applicant offer a review of the above in direct response to the *Office Action* of August 2009 at page 5, where it was indicated that the superior or unexpected results must be factually supported by an appropriate affidavit. Applicant notes that the specification, as noted in paragraph **[0021]** above, speaks to this point directly. Applicant therefore has amended the claims to reflect a feature not present in the art (the unique failure mode in conjunction with the unexpected ASTM bond strength) and notes the discussion in the specification by the inventor confirming that the results herein were remarkable and not previously observed. This is also believed underscored by the fact that the art of record (*Dorfman* and/or *Branagan*) do not teach or suggest anything regarding selecting deoxidizing elements to remove oxygen from the metal surface layer where said deoxidizing elements are present in said alloy melt such that said deoxidizing elements remain dissolved in said alloy melt to retain an affinity for oxygen; and wherein failure of said coating does not occur at a coating/metal surface interface. See again amended claim 6.

Accordingly, Applicant respectfully submits that independent claim 6 and the claims dependent therefrom define over the references cited herein and request that the rejections be withdrawn.

Having dealt with all the objections raised by the Examiner, it is respectfully submitted that the present application, as amended, is in condition for allowance. Thus, early allowance is earnestly solicited.

If the Examiner desires personal contact for further disposition of this case, the Examiner is invited to call the undersigned Attorney at 603.668.6560.

In the event there are any fees due, please charge them to our Deposit Account No. 50-2121.

Respectfully submitted,

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